

**What is claimed is:**

1. A method of manufacturing semiconductor devices, comprising the steps of:

- 5 forming a sacrificial oxide film on a semiconductor substrate;  
forming a triple well on the semiconductor substrate;  
implanting an inert ion into the semiconductor substrate, by a given depth, to form an anti-diffusion layer;  
implanting an ion for adjusting the threshold voltage into the  
10 semiconductor substrate on the anti-diffusion layer;  
removing the sacrificial oxide film and then sequentially forming a tunnel oxide film, a polysilicon layer and a pad nitride film on the semiconductor substrate;  
patterning the pad nitride film by means of an isolation mask and then  
15 sequentially etching exposed portions of the polysilicon layer, the tunnel oxide film and the semiconductor substrate to form a trench; and  
forming an oxide film on the entire structure so that the trench is buried, planarizing the surface of the oxide film, and then removing remaining pad nitride film to form an isolation film within the trench.

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2. The method as claimed in claim 1, wherein the inert ion is a nitrogen ion and is implanted using  $\text{NH}_3$  as a source gas at the dose of  $5\text{E}12 \sim 5\text{E}13 \text{ ion/cm}^2$  and with energy of  $500 \sim 1500\text{KeV}$ .

3. The method as claimed in claim 1, wherein the sacrificial oxide film is formed in thickness of 70 ~ 100Å by means of cleaning process using a mixed solution of DHF(50:1) + SC-1(NH<sub>4</sub>OH/H<sub>2</sub>O<sub>2</sub>/H<sub>2</sub>O), or BOE(100:1 or 300:1) + SC-1(NH<sub>4</sub>OH/H<sub>2</sub>O<sub>2</sub>/H<sub>2</sub>O) at a temperature of 750 ~ 800 °C.

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4. The method as claimed in claim 1, wherein the ion for adjusting the threshold voltage is a boron (B11) ion and is implanted at the dose of and 1E11 ~ 1E13 ion/cm<sup>2</sup>.

10 5. The method as claimed in claim 1, wherein the sacrificial oxide film is removed by cleaning process us DHF(50:1) + SC-1(NH<sub>4</sub>OH/H<sub>2</sub>O<sub>2</sub>/H<sub>2</sub>O).

6. A method of manufacturing semiconductor devices, comprising  
15 the steps of:

forming a sacrificial oxide film on a semiconductor substrate;

forming a triple well on the semiconductor substrate;

implanting an ion of a heavy weight into a channel region of the semiconductor substrate to form an ion implantation layer;

20 implanting an ion for adjusting the threshold voltage into the ion implantation layer;

removing the sacrificial oxide film and then sequentially forming a tunnel oxide film, a polysilicon layer and a pad nitride film on the semiconductor substrate;

patterning the pad nitride film by means of an isolation mask and then sequentially etching exposed portions of the polysilicon layer, the tunnel oxide film and the semiconductor substrate to form a trench; and

forming an oxide film on the entire structure so that the trench is buried,  
5 planarizing the surface of the oxide film, and then removing remaining pad nitride film to form an isolation film within the trench.

7. The method as claimed in claim 6, wherein the ion of a heavy weight is an arsenic (As75) ion and is implanted at the dose of  $5E11 \sim 5E13$   
10  $\text{ion}/\text{cm}^2$  and with energy of  $10 \sim 100\text{KeV}$ .

8. The method as claimed in claim 6, wherein the sacrificial oxide film is formed in thickness of  $70 \sim 100\text{\AA}$  by means of cleaning process using a mixed solution of DHF(50:1) + SC-1( $\text{NH}_4\text{OH}/\text{H}_2\text{O}_2/\text{H}_2\text{O}$ ), or BOE(100:1 or  
15  $300:1$ ) + SC-1( $\text{NH}_4\text{OH}/\text{H}_2\text{O}_2/\text{H}_2\text{O}$ ) at a temperature of  $750 \sim 800^\circ\text{C}$ .

9. The method as claimed in claim 6, wherein the ion for adjusting the threshold voltage is a boron (B11) ion and is implanted at the dose of and  $1E11 \sim 1E13 \text{ ion}/\text{cm}^2$ .

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10. The method as claimed in claim 6, wherein the sacrificial oxide film is removed by cleaning process us DHF(50:1) + SC-1( $\text{NH}_4\text{OH}/\text{H}_2\text{O}_2/\text{H}_2\text{O}$ ).